COCCIDIOIDOMYCOSIS

(San Joaquin Valley fever, Valley fever, Desert fever)

✓ DISEASE AND EPIDEMIOLOGY

Clinical Description:

After infection, a wide spectrum of manifestations is possible. Coccidioidomycosis first infects a person's lungs, and 50-60% of people that become infected will not develop symptoms. Most persons with symptomatic disease will develop a moderate influenzalike illness with malaise, fever, chills, and cough accompanied by nodules or peripheral thin-walled cavities. Symptoms may last for weeks to months, and the majority of infections will resolve without specific antifungal therapy. A smaller percent of infections result in chronic pulmonary or extrapulmonary infections. Cutaneous manifestations include erythema nodosum and erythema multiforme.

Although coccidioidomycosis primarily involves the bronchopulmonary system, dissemination can occur to multiple organ systems. Approximately 1 in 1,000 cases of coccidioidomycosis will progress to disseminated coccidioidomycosis, which is the most severe form of the disease. Disseminated disease forms lesions in the lung and abscesses throughout the body. These abscesses tend to form in the subcutaneous tissues, skin, bone and the central nervous system (the brain and spinal cord). People of African or Asian descent, pregnant women and people who are immunocompromised are at increased risk for developing disseminated coccidioidomycosis

Causative Agent:

Coccidioidomycosis is caused by spores of a fungus called Coccidioides immitis.

Differential Diagnosis:

The differential diagnosis for coccidioidomycosis includes other fungal infections, lymphoma, tuberculosis, and other granulomatous infections.

Laboratory identification:

Multiple methods for diagnosing coccidioidomycosis are available.

Culture:

Isolation of Coccidioides species in culture is definitive evidence of infection. When a specimen is sent from a patient with possible coccidioidomycosis, the receiving laboratory should be notified, since secondary cases have been reported in laboratory workers opening the plates for inspection. However, healthcare workers collecting the specimen are at no risk, since coccidioidomycosis is not transmitted person-to-person. **Serology:**

Serologic testing is the most common means of diagnosing coccidioidomycosis, and several serologic tests, including ELISA, complement fixation (CF), and immunodiffusion (ID) assays, are available. ID assays primarily measure IgM antibodies, however IgG antibodies may also detected. ELISA and CF measure both IgG and IgM. While IgM antibodies are produced early in illness, IgG antibodies generally appear 2-6

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weeks after infection. Most tests are highly specific for active infection. Any positive serologic result, even minimally reactive, is likely to be clinically relevant. A negative serologic result, however, never excludes the diagnosis of coccidioidomycosis. Performing one or more tests over the course of 2 months increases the sensitivity.

Coccidioidomycosis Serological Test Interpretation	
IgM or IgG ELISA	Less then testing platform threshold is Negative
	Greater then negative threshold, but less then positive threshold is Equivocal .
	Repeat testing in 10-14 days may help eliminate an equivocal result.
	Greater then testing platform threshold is Positive
ID	Measures IgM and a positive result may suggest active or recent infection. Serum precipitins** may be detected within 1-3 weeks after the onset of primary infection, but are rarely detected 6 months after infection. Precipitins may reappear with relapse or persist in disseminated cases. IgG antibody may also be detected.
CF	Any titer suggests past or current infection. Greater then 30% of cases with chronic residual pulmonary disease have negative CF test results. Titers of less then 1:32 or 1:2 may indicate past infection or self-limited disease. Titers greater than or equal to 1:32 may indicate disseminated infection. Single antibody titers are generally not diagnostic, paired samples are preferred. Acute and convalescent samples drawn at least 21 days apart, showing at least a fourfold rise in titer, are diagnostic.

^{**}An antibody that under suitable conditions combines with and causes its specific and soluble antigen to precipitate from solution.

Microscopy:

The diagnosis of coccidioidomycosis can be made by identifying fungal spherules in tissue specimens.

Skin testing:

The coccidioidomycosis skin test can generate an immune response if the patient has antibodies to *C immitis* circulating in their blood. The immune response indicates an exposure to *C. immitis*. The two antigens used in the skin test are coccidioidin prepared from *C. immitis* mycelium and spherulin prepared from spherule-endospores. The test includes injecting the antigens just below the skin surface and then waiting 24 to 48 hours to read the test result. If the test result is positive there is an immune response at the injection site. The immune response includes inflammation and swelling. If the test is negative there is no immune response to the coccidioidin or spherulin antigens.

Treatment:

Mild cases of coccidioidomycosis usually resolve without treatment. However, treatment may shorten the course of illness or prevent complications and thus is necessary for severe cases. Opinion varies about the most relevant factors to judge the severity of illness. However, commonly used indicators are:

- Greater than 10 percent loss of body weight;
- Intense night sweats persisting greater than three weeks;
- Infiltrates involving more than half of one lung or portions of both lungs;
- Prominent or persistent hilar adenopathy;
- Anti-coccidioidal complement fixing antibody concentrations in excess of 1:16;
- Failure to develop dermal hypersensitivity to coccidioidal antigens;

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- Inability to work; or
- Persisting symptoms for more than two months.

The most frequently used oral antifungals are fluoconazole and itraconazole. Surgical removal of cavities in the lung and drainage of abscesses in bones or joints is sometimes necessary. The duration of treatment for uncomplicated primary coccidioidal infection generally ranges from three to six months.

Case fatality:

Case fatality rate estimates range from 12-17%. Coccidioidal meningitis, the most serious form of disseminated disease, is almost always fatal within 2 years of diagnosis if left untreated.

Reservoir:

C. immitis grows in the soil.

Transmission:

Anyone who is present near dust-producing activities where soil or other materials contaminated with *C. immitis* are present can get coccidioidomycosis if enough spores are inhaled. People can be exposed to *C. immitis* spores during recreational or occupational activities including digging, farming, construction work, driving off road vehicles, riding ATVs, biking, camping, and hiking. Living in or traveling through an endemic area can lead to an exposure and illness. Coccidioidomycosis is not contagious; it cannot be transmitted from an infected person or animal to someone else.

Susceptibility:

Anyone can get coccidioidomycosis. Life long immunity almost always develops following infection.

Incubation period:

Symptoms of disease usually start within one to four weeks after exposure. Disseminated disease may develop years after the primary infection (even when the primary infection was so mild that the patient does not remember having it).

Period of communicability:

NA

Epidemiology:

C. immitis grows in arid and semiarid areas of the Western Hemisphere. In the US, this range extends from California to southern Texas, and includes parts of Utah. The soil conditions in southern Utah are well suited for growing the fungus *Coccidioides immitis*. 56 cases of coccidioidomycosis were reported to the Utah Department of Health in 2006; twice as many as were reported for the previous two years.

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✓ PUBLIC HEALTH CONTROL MEASURES

Public health responsibility:

- Investigate all suspect cases of disease and fill out and submit appropriate disease investigation forms.
- Provide education to the general public, clinicians, and first responders regarding disease transmission and prevention
- Identify clusters or outbreaks of this disease and determine the source.
- Identify cases and sources to prevent further transmission.

Prevention:

The best way to prevent exposures to *C. immitis* spores is to avoid situations where soil that might be contaminated can be inhaled. People living in endemic areas can help prevent illness with decreasing the amount of dust in their environment by installing air conditioning, pouring asphalt, or planting grass. These measures will help decrease dust but will not eliminate *C. immitis* from their environment.

Chemoprophylaxis:

None.

Vaccine:

None.

Isolation and quarantine requirements:

Isolation: NA Hospital: NA Quarantine: NA



Reporting:

All cases of coccidioidomycosis should be reported to public health.

Case definition:

Coccidioidomycosis (Coccidioides immitis) (1996) Clinical description

Infection may be asymptomatic or may produce an acute or chronic disease. Although the disease initially resembles an influenza-like febrile illness primarily involving the bronchopulmonary system, dissemination can occur to multiple organ systems.

Clinical case definition

An illness characterized by one or more of the following:

- Influenza-like signs and symptoms (e.g., fever, chest pain, cough, myalgia, arthralgia, and headache);
- Pneumonia or other pulmonary lesion, diagnosed by chest radiograph;

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- Erythema nodosum or erythema multiforme rash;
- Involvement of bones, joints, or skin by dissemination;
- Meningitis;
- Involvement of viscera and lymph nodes.

Laboratory criteria for diagnosis

- Cultural, histopathologic, or molecular evidence of presence of *Coccidioides* species, or
- Positive serologic test for coccidioidal antibodies in serum, cerebrospinal fluid, or other body fluids by:
 - Detection of coccidioidal immunoglobulin M (IgM) by immunodiffusion, enzyme immunoassay (EIA), latex agglutination, or tube precipitin, or
 - Detection of coccidioidal immunoglobulin G (IgG) by immunodiffusion, EIA, or complement fixation, or
- Coccidioidal skin-test conversion from negative to positive after onset of clinical signs and symptoms

Case classification

Confirmed: A case that meets the clinical case definition and is laboratory confirmed.

Case Investigation Process:

• Fill out a morbidity form.

Outbreaks:

Outbreaks due to coccidioidomycosis are not common, but can occur following dust storms, earthquakes and soil excavation.

Identification of case contacts and management:

NA

✓ REFERENCES

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